

# Developing a Computer-based Learning Package for Better Collocations in Technical Writing

*Bruce K C Ma*

*City University of Hong Kong*

## Abstract

Collocational appropriateness has long been a difficult area for ESL students. This paper presents a report of a project that uses a corpus of learner writing for developing a computer-based learning package for students studying for the Higher Diploma in Building Services Engineering at City University of Hong Kong. A corpus of learner writing -- site investigation reports -- was used to reveal common lexical collocation problems, with the help of a concordancing programme. These problems formed the basis of the learning package, which aims at increasing learners' awareness of the collocation problems they often have in their specific type of writing and helping learners to master the correct collocations. The learning package was integrated into the existing curriculum as pre- and while-writing activities. Learners' responses to the package and their post-learning writing were also studied to evaluate the package.

## Background

This paper presents a report of a project that aims to develop a computer-based learning package for the final-year students studying Higher Diploma courses in Building Services Engineering and Architectural Studies at City University of Hong Kong. The package is designed to help these students improve their collocational competence.

The project was initiated as a result of a previous study that I and a colleague of mine, Mr Neil Drave, did in 1993 (Ma and Drave, 1993). In this study the writing of the group of students mentioned was examined. It threw up a list of the problem collocations that these students have in their writing. It is based on this list of collocation problems that the learning package is designed and developed.

## Definition

In its most general sense, collocation is "the way in which words are used together regularly" (Richards, Platt and Weber, 1985: 46). Firth (1957) gives a more technical definition: "Collocation refers to the syntagmatic relations into which lexical items habitually enter, and is considered as a part of the meaning of the lexical items concerned."

Generally speaking, competent speakers of English know when the right combination of words has been chosen and it is this ability which constitutes partly their intuitions about the language. They know, for example, that we *have a dream, make a mistake, but bake a cake*; we talk about *weak tea*, but not *feeble tea*. And it is this ability to use the appropriate collocations that we call collocational competence.

The major characteristics of collocations are that “their meanings reflect the meaning of their constituent parts and that they are used frequently, spring to mind readily, and are psychologically salient” (Bahns and Eldaw, 1993).

Collocations may be classified as either grammatical or lexical according to the grammatical categories of the words which constitute them (Benson 1985a, Benson, 1985b). According to Benson, a grammatical collocation consists of a “dominant word”, typically a verb, a noun or an adjective, followed by a grammatical word, typically a preposition. In contrast, a lexical collocation does not have a subordinate element; it usually consists of adjective + noun, noun + verb or verb + noun (Benson, *ibid.* 62).

The present project, as well as the study Drave and I did last year (Ma and Drave, 1993), focuses on lexical collocations only.

## **Rationale**

The present project was initiated with the following in mind:

### 1. Collocation has been neglected in ESL.

Collocational behaviour, i.e. the phenomenon that words combine more frequently with some words than with others, is in a sense intuitive for competent speakers of English. But how ESL learners come to grips with collocations is still an understudied area and nothing much has been said about how collocational competence is acquired. One thing we can say for sure, though, is that collocation has been neglected in most ESL programmes around the world, ESP programmes in particular. Despite the increasing concern in ESL in giving more attention to lexical phrases and collocations, for example in Nattinger and DeCarrico (1992) and Lewis (1993), the situation does not seem to have improved substantially.

### 2. Collocations present great difficulty to learners, even at an advanced level

According to Benson (1985b), many “collocations are arbitrary and non-predictable”, non-native speakers of English find them very difficult to cope with unless they have “a guide”. Even a native speaker sometimes has to refer to some references before deciding which word collocates with a word he wants to use.

ESL curriculum designers and teachers have tended to assume that learners acquire collocational competence as they develop their vocabulary. However,

a study by Bahns and Eldaw (1993) has proved this to be untrue: "... learners' knowledge of collocations lags far behind their knowledge of vocabulary in general." With translation tasks, Bahns and Eldaw also establish in their study that collocations have to be taught explicitly, as learners fail to paraphrase around them.

From my own experience, even very advanced level students, including students at postgraduate levels, fail to use collocations correctly, though they may have a very confident mastery of grammatical structures and a large vocabulary. This is confirmed in the literature (Bahns, 1993; Bahns and Eldaw, 1993; Benson, 1985a, 1985b; Brown, 1974; Mackin, 1978).

### 3. Reference works on lexical collocations are scarce.

In reference works like dictionaries and grammar and usage handbooks, it is easy to find hints and explanations for grammatical collocations. As far as lexical collocations are concerned, the only works available so far seem to be:

- The Word Finder (Rodale, J. I., 1947)
- Oxford Dictionary of Current Idiomatic English (Cowie et al., 1975, 1983)
- The BBI Combinatory Dictionary of English (Benson, Benson and Ilson, 1986)
- A Dictionary of English Collocations. (Huang, W., 1991)
- Longman Dictionary of Collocations (Benson, Benson and Ilson, 1995)

### 4. Collocations are context-dependent.

Each of the above-mentioned reference works provide tens of thousands of collocations, but it is obvious that they cannot provide an exhaustive list. All these works, like an ordinary dictionary, cater to a general readership. When it comes to technical words in a particular field, learners are let down. (BBI does not for example include the word *ledger*.) In recent years, dictionaries on special subjects have grown to tremendous numbers, but it appears a long way before any major specialist collocation dictionaries will be developed.

Collocations are context-dependent in that they can only be evaluated in the context in which they occur and here we use the word "context" to mean both the linguistic environment and the social situation. What collocates with a word in one context may not be the acceptable collocate in another context. A typical example quoted in Benson (1985b) is the verb-noun collocations with the word "line": *draw a line* (on paper); *form a line* (= line up); *introduce a (bus) line*; *drop somebody a line*. A knowledge of the correct collocates in a certain field is therefore particularly worthy of our attention when working with ESP courses.

As mentioned before, even advanced ESL learners are found to have great difficulty with collocations. When it comes to ESP writing, they are even

helpless as no references are available for the subject in which they specialise. To illustrate my point, I will show you some common problems in Table 1.

**Table 1 Common Collocation Problems of ESP Learners**

<b>Subject</b>	<b>Incorrect Collocation</b>	<b>Correct Collocation</b>
Building	paint drops	paint flakes
	a fire happens	a fire occurs
Computer	cancel a file	delete a file
	press a button with a mouse	click a button with a mouse
Accounting	record a ledger	keep a ledger
	do an inventory	make an inventory
Electrical Engineering	break down a wire	overload a wire
	make a short circuit	cause a short circuit
General	improve the problem	improve the situation / resolve the problem
	take an investigation	conduct an investigation

It is with the intention to help ESP learners with collocations in their field that a learning package has been developed. This is a computer-based learning package which I call "Building Words" and it represents my initial attempt to give help to Building-related students on this thorny problem of collocations.

### **Design**

I mentioned earlier that Bahns and Eldaw (1993) suggest that we should teach collocations explicitly. They also point out that the order in which we teach collocations could be determined by how readily a collocation can be paraphrased by the learner. Collocations which are less susceptible to ready paraphrasing should be introduced and taught first.

This is a good guiding principle, but when it comes to deciding which collocations are to be included in an ESP programme, programme designers still have nothing to rely on. I would like to propose using the word list in students' writing as a guide.

In the study Drave and I did (Ma and Drave, 1994), we first collected a set of texts from our learners, 56 Year-3 students of Higher Diploma in Building Services Engineering and in Architectural Studies. They were doing an ESP course (HS0163) where the major assignment was to write a technical investigation report. The 16 site investigation reports they wrote formed the basis of the corpus. The reports were written after a visit to a chosen site when students either investigated the structural and building services defects, or they investigated the feasibility of converting the site for a different function, say converting a market into a sports complex. These reports were produced over 7 weeks using a process writing approach. The first drafts of their writing, each consisting of about 35,000 words, were examined. So the

corpus is one of a total of 49,260 words. Since it is a relatively small and specialised corpus, we used the Longman Mini-Concordancer (LMC) to help analyse the texts.

With the word frequency facility of the LMC, we were able to generate a word list of all the words used in this learner corpus. Then, we looked at the 140 concordance lines of the first 44 most frequently used content words, since we were looking at lexical collocations only. Each of these words are used at least 27 times in the corpus, the highest frequency of occurrence being 609 times.

The words we studied thus arguably represent words that learners need to use frequently when writing reports of this kind, and the collocational associations of these words are therefore arguably what we should teach students about.

We then highlighted those lines that were suspected to constitute a collocation problem. With a word processor, we grouped these lines together and approached 8 native speaker informants, 4 from the field of English Language Teaching and 4 from Building and Construction. It was explained to them what collocation problems are and they were asked to say whether the key word given in the keyword-in-context (KWIC) concordance lines represents correct use of collocates or not. Correct collocates are given ticks, incorrect ones crosses and dubious ones question marks. A suspected problem was given a problem status only if there was unanimous (8 crosses) or near unanimous (7 crosses) agreement among the informants on its status. There were found to be 24 problem collocates.

In order to provide substantial input for a learning package to be created, I decided to target a total of 40 problems. The items in the 140 concordance lines that are less problematic according to the informants were studied against the following dictionaries from the library:

- Penguin Dictionary of Building
- Collins Dictionary of Building
- Builder's Comprehensive Dictionary
- Construction Glossary
- The BBI Combinatory Dictionary
- Chambers English Dictionary
- Oxford Advanced Learner's Dictionary of Current English
- Collins Concise English Dictionary

A problem status was assigned to 16 more items and the correct collocations were found out for all the 40 and these then formed the basis of the learning package

## The Learning Package: “Building Words”

In designing the learning package, I adapted the authoring shell developed by Clarity Language Consultants, which provides a framework for building a lesson with language input, practice exercises, and tests.

There are four lessons in the package, developed according to the collocation problems found. Here I will show you in Table 2 the incorrect and correct collocations discussed in the four lessons. (Readers who are interested in the package are welcome to get in touch with me for more details.)

**Table 2 Collocations in “Building Words”**

### *Lesson 1 Investigation*

<b>Problem Collocation</b>	<b>Correct Collocation</b>
have a fire	a fire occurs
fire spreads out	fire spreads
paint drops	paint flakes
make cracking	cause cracking
cracks propagate	cracks spread
make a short circuit	cause a short circuit
method is installed	method is adopted
take an investigation	conduct an investigation
it lights (people)	it provides light (for people)
notice the location (of something)	give the location (of something)

### *Lesson 2 Problems*

<b>Problem Collocation</b>	<b>Correct Collocation</b>
fire potential	fire risk
chance of causing fire	likelihood of causing fire
fire happens	fire occurs
insulation is broken	insulation becomes ineffective
plaster drops down	plaster flakes
produce cracks	cause cracks
break down a wire	overload a wire
be found obviously	be found easily
discomfort air	air falls outside the comfort zone

### *Lesson 3 Solutions*

<b>Problem Collocation</b>	<b>Correct Collocation</b>
fire detective system	fire detector system
improve the poor insulation	improve the quality of the insulation
give more efficient transportation	provide more efficient transportation
good workmanship is used	good workmanship is required
fulfils the standard	conforms to the standard
cover the requirements	satisfy the requirements
changing of the system	modification to the system

make discussion	discuss
solving method	solution
remedy methods	remedial work
improve a disadvantage	rectify a fault

#### *Lesson 4 General*

<b>Problem Collocation</b>	<b>Correct Collocation</b>
a lift stays (in the lobby)	a lift remains (in the lobby)
the length of the reels	the capacity of the reels
performance is detected	performance is monitored
improve the problems	resolve the problems
the cost used is	the cost is
wires are tidied up	cables are enclosed
higher degree of insulation	better insulation
it has high durability	it is durable
increased speed should be used	it should be done faster
to give convenience to	for the convenience of

### **Evaluation**

The package was tried out for the first time in Semester B 1994/5 in two classes of Higher Diploma in Building Services Engineering (HDBSE) students, with a total of 36 students. Evaluation of the learning package was done in three ways. The package will further be improved in light of the comments and suggestions received, if resources so allow, and will be used again in the future and further evaluated.

#### *Questionnaires*

A questionnaire was designed to solicit learners' response to the learning package. The questionnaire contained questions seeking responses to the learning package, the learning package and the module, and the computer interface. Learners were asked to show whether they agreed with the statements given on a 5-point scale, with 1 meaning complete disagreement and 5 meaning complete agreement. The mean scores are tabulated in Table 3 below.

**Table 3 Results of Evaluation Questionnaires**

<b>Statement</b>	<b>Mean Score</b>
<b>1. The learning package</b>	
1.1 The package is generally interesting.	3.44
1.2 The package is generally useful.	3.70
1.3 The package is generally stimulating.	3.27
1.4 It has increased my awareness of the need to better master collocations in my writing.	3.44

1.5 It has increased my understanding of how words collocate with one another.	3.67
1.6 It has improved my use of words in general.	3.50
1.7 It has helped me in the writing assignments for the English module (HS0163).	3.50
1.8 It has helped/will help me in the assignments for my core modules.	3.38
1.9 More collocations should be taught in the package.	3.50
1.10 The package should have more lessons.	3.33
<b>2. The learning package and the module</b>	
2.1 The package is a worthwhile addition to the module HS0163.	3.72
2.2 The package is taking up a right proportion of the module.	3.50
2.3 The package is introduced at the right time of the module.	3.28
<b>3. The computer interface</b>	
3.1 The interface is very user-friendly.	3.44
3.2 The interface is well-designed.	3.50

The results of the questionnaires show that most learners are happy with the package and think that it is a good addition to the course. The fact that most ratings centre around the middle shows perhaps that learners find the package satisfactory, but not excellent. There are some encouraging comments in the questionnaires:

- *The material is useful for us to do assignments in this module.*
- *Easy to use and quite interesting.*
- *Easy to understand.*
- *Good enough.*

#### *Interviews and Open-ended comments*

Interviews with learners reveal that they very often compare what they are looking at with the windows-based software packages that they are so used to working with. Many even expect the inclusion of multimedia elements, like sound and video, in the package. Some complain of the need to do too much reading on screen. This is confirmed with some of the responses obtained from the open-ended questions in the questionnaire.

- *A little bit too many words to read.*
- *The interface should be more user-friendly, eg Windows.*
- *The computer interface should have a window working environment in order to be more user friendly.*
- *Computer interface should have a sound effect and a voice out when you are right.*
- *Add sound effects to make it more interesting.*



Interviews also review that content-wise, learners generally feel that the collocations learnt are relevant to what they are doing or what they will do in their career. Some call for more examples of correct collocations of a particular head word (the node) while many call for more collocations to be learnt and more time to be spent on collocations. Some of their unedited comments are quoted as follows:

- *Increase the example in each words.*
- *Different example may be better.*
- *The package is useful but it is not enough collocation for me to learn.*
- *More lesson may be better.*
- *More tests may be better.*
- *More tests and practices may be better.*
- *The learning package is not enough, prefer to do much more.*

Another suggestion made by many is to include printing facilities in the learning so that they can keep a copy of the correct collocations. The following are what learners say:

- *A summary of collocations can be read and printed out will be more better.*
- *Program should provide hard copy output as the user want to print out the correct screen of display.*
- *Handout should be printed out in the program.*

Personally I feel it would definitely help to develop the package on a graphical interface, e.g. Windows, which provides a multimedia ready environment for the inclusion of audio and animation effects to increase audience motivation. The provision of printing facilities could be considered, or a set of handouts containing all the correct collocations could be a viable and less costly alternative serving the same purpose.

#### *Examination of post-learning writing*

Learners working with the package were also required to write reports similar to those from which the learner corpus was created -- site investigation reports. I studied a corpus of their reports, which consists of 48,123 words from 13 reports, and ran concordances of the relevant key words. With the "proximity" feature of the concordancer I have been able to get a good idea whether learners show a mastery of the collocations learned in the package, i.e. whether they make the same collocation mistakes or are able to demonstrate use of the collocations correctly. I am happy to find that the rate of occurrence of the problem collocations is very low and there is a pleasing success rate in using the correct ones. Table 4 shows the results of my concordance-based analysis, with the key words highlighted in boldtype.

**Table 4 Collocational Success and Failure in Post-learning Writing**

*Lesson 1 Investigation*

<b>Problem Collocation</b>	<b>Frequency of occurrence</b>	<b>Correct Collocation</b>	<b>Frequency of occurrence</b>
have a <b>fire</b>	0	a <b>fire</b> occurs	19
<b>fire</b> spreads out	0	<b>fire</b> spreads	2
<b>paint</b> drops	0	<b>paint</b> flakes	4
make <b>cracking</b>	0	cause <b>cracking</b>	2
<b>cracks</b> propagate	0	<b>cracks</b> spread	0
make a <b>short circuit</b>	NM	cause a <b>short circuit</b>	NM
<b>method</b> is installed	2	<b>method</b> is adopted	2
take an <b>investigation</b>	0	conduct an <b>investigation</b>	4
it <b>lights</b> (people)	0	it provides <b>light</b> (for people)	3
notice the <b>location</b> (of something)	1	give the <b>location</b> (of something)	4

*Lesson 2 Problems*

<b>Problem Collocation</b>	<b>Frequency of occurrence</b>	<b>Correct Collocation</b>	<b>Frequency of occurrence</b>
<b>fire</b> potential	0	<b>fire</b> risk	5
chance of causing <b>fire</b>	0	likelihood of causing <b>fire</b>	1
<b>fire</b> happens	0	<b>fire</b> occurs	19
<b>insulation</b> is broken	NM	<b>insulation</b> becomes ineffective	NM
<b>plaster</b> drops down	1	<b>plaster</b> flakes	8
produce <b>cracks</b>	0	cause <b>cracks</b>	0
break down a <b>wire</b>	0	overload a <b>wire</b>	0
be <b>found</b> obviously	0	be <b>found</b> easily	1
discomfort <b>air</b>	0	<b>air</b> falls outside the comfort zone	0

*Lesson 3 Solutions*

<b>Problem Collocation</b>	<b>Frequency of occurrence</b>	<b>Correct Collocation</b>	<b>Frequency of occurrence</b>
<b>fire</b> detective system	0	<b>fire</b> detector system	28
improve the <b>poor</b> insulation	0	improve the <b>quality</b> of the insulation	1
give more efficient <b>transportation</b>	0	provide more efficient <b>transportation</b>	0
good <b>workmanship</b> is used	0	good <b>workmanship</b> is required	3
fulfils the <b>standard</b>	2	conforms to the <b>standard</b>	10
cover the <b>requirements</b>	0	satisfy the <b>requirements</b>	7
changing of the <b>system</b>	0	modification to the <b>system</b>	4
make <b>discussion</b>	0	<b>discuss</b>	0

solving <b>method</b>	0	<b>solution</b>	24
remedy <b>methods</b>	0	remedial <b>work</b>	2
improve a <b>disadvantage</b>	1	rectify a <b>fault</b>	1

#### Lesson 4 General

<b>Problem Collocation</b>	Frequency of occurrence	<b>Correct Collocation</b>	Frequency of occurrence
a <b>lift</b> stays (in the lobby)	3	a <b>lift</b> remains (in the lobby)	0
the length of the <b>reels</b>	2	the capacity of the <b>reels</b>	0
<b>performance</b> is detected	0	<b>performance</b> is monitored	1
improve the <b>problems</b>	2	resolve the <b>problems</b>	0
the <b>cost</b> used is	0	the <b>cost</b> is	5
<b>wires</b> are tidied up	0	<b>cables</b> are enclosed	0
higher degree of <b>insulation</b>	NM	better <b>insulation</b>	NM
it has high <b>durability</b>	NM	it is <b>durable</b>	NM
increased <b>speed</b> should be used	0	it should be <b>done</b> faster	0
to give <b>convenience</b> to	0	for the <b>convenience</b> of	0

*NM = No matching string is found in the corpus.*

## Conclusion

What I have done represents an initial attempt to provide help to ESP learner writers in building their collocational competence relevant to genres of their own field of study, in this case, building services engineering. The learning package developed addresses some of the most frequently occurring collocation problems these students have. Judging from the numerous responses calling for more collocations to be taught, I believe at least I am on the right track. The post-learning corpus also shows encouraging evidence that students did learn to avoid most common problem collocations and master the correct ones, though there is also evidence that some problems are more persistent than others and consequently deserve more serious attention. The package of course still has a lot of room for improvement, particularly in its interface design. With the technology available, I am sure we can go on to improve it in a such a way that learning will be made even more interesting (provided we have the resources).

The authoring shell we have used allows us to further develop and enrich the package in its present form as we come to identify more problematic collocations from a larger or additional corpus. I honestly believe that this is what we should do. I am prepared to keep my work going until we have obtained a comprehensive and interesting learning package for the students concerned.

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- whether there is any complication resulting from the learning, e.g. will what they have learned result in other kind of errors

I hope this will give me more insights as to how the learning package could be further improved.

But at the moment we have to wait for the funds to make any modification to the package. On the other hand, I would very much like to make sure that the contents of the lessons are appropriate before moving on to enhance the user interface or provide add-on facilities.

There was one questionnaire for each of the four lessons, while there was a last one which aimed at getting comments and feedback on the package as a whole.